**NRM 85 Course Outline as of Spring 2002**

# CATALOG INFORMATION

Dept and Nbr: NRM 85 Title: FOR HYDROL & WTRSHD MGMT
Full Title: Forest Hydrology and Watershed Management
Last Reviewed: 2/14/2011

| Units | | Course Hours per Week | | Nbr of Weeks | Course Hours Total | |
|---|---|---|---|---|---|---|
| Maximum | 4.00 | Lecture Scheduled | 3.00 | 17.5 | Lecture Scheduled | 52.50 |
| Minimum | 4.00 | Lab Scheduled | 2.00 | 17 | Lab Scheduled | 35.00 |
| | | Contact DHR | 0 | | Contact DHR | 0 |
| | | Contact Total | 5.00 | | Contact Total | 87.50 |
| | | Non-contact DHR | 0 | | Non-contact DHR | 0 |

Total Out of Class Hours: 105.00 Total Student Learning Hours: 192.50

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| Title 5 Category: | AA Degree Applicable |
| Grading: | Grade or P/NP |
| Repeatability: | 00 - Two Repeats if Grade was D, F, NC, or NP |
| Also Listed As: | |
| Formerly: | |

**Catalog Description:**
This course serves as an introduction to forest and wildland hydrology, and the management of resources on a watershed scale. The material covered will include the fundamental concepts of the hydrologic cycle: precipitation, interception, evaporation, evapotranspiration and runoff, infiltration, and groundwater. The fundamentals of protection, management, and monitoring watersheds in California will be emphasized.

**Prerequisites/Corequisites:**

**Recommended Preparation:**
Eligibility for ENGL 100 or ESL 100

**Limits on Enrollment:**

**Schedule of Classes Information:**
Description: This course serves as an introduction to forest and wildland hydrology, and the management of resources on a watershed scale. The material covered will include the fundamental concepts of the hydrologic cycle: precipitation, interception, evaporation, evapotranspiration and runoff, infiltration, and groundwater. The fundamentals of protection,

management, and monitoring watersheds in California will be emphasized. (Grade or P/NP)
Prerequisites/Corequisites:
Recommended: Eligibility for ENGL 100 or ESL 100
Limits on Enrollment:
Transfer Credit: CSU;
Repeatability: Two Repeats if Grade was D, F, NC, or NP

## ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

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|---|---|---|---|---|---|
| **AS Degree:** | **Area** | | | Effective: | Inactive: |
| **CSU GE:** | **Transfer Area** | | | Effective: | Inactive: |
| **IGETC:** | **Transfer Area** | | | Effective: | Inactive: |
| **CSU Transfer:** | Transferable | Effective: | Fall 1999 | Inactive: | Fall 2019 |
| **UC Transfer:** | | Effective: | | Inactive: | |

**CID:**

**Certificate/Major Applicable:**
Both Certificate and Major Applicable

## COURSE CONTENT

**Outcomes and Objectives:**
The student will:
1. Define the hydrologic cycle and explain the various processes of the cycle.
2. Construct a stream hydrograph and analyze its various components.
3. Inventory and appraise various watershed characteristics such as: area, drainage density, relief ratio, circularity ratio, stream order, etc.
4. Calculate the average precipitation of a drainage basin using various approaches including: Theissen polygon method, Isohyetal method, and arithmetic average method.
5. Recognize and demonstrate runoff and infiltration principles and processes.
6. Describe the effects of various resource management practices on water yield.
7. Recognize and discuss important water issues in California.

**Topics and Scope:**

I. Introduction to Water Resources in California.
   a. History of water development.
   b. Regional basis of supply and demand for water.
   c. Conflicts among the different user groups.
   d. State, federal and local water projects in California.
II. The Hydrologic Cycle, Water and Energy Budgets.
   a. Physical processes, storage and transport of water.

b. Water: physical properties, molecular structure and phases.
c. Energy exchange and effect on hydrologic functioning.

III. Atmospheric Precipitation.
a. Types of precipitation: rain, snow, fog.
b. Measurement: annual amounts, intensity and seasonal variation.
c. Geographic and topographic variation of precipitation.
d. Basin precipitation: measurement and analysis.

IV. Canopy Interception and Redistribution of Water.
a. Vegetation canopy characteristics and water storage capacity.
b. Canopy throughfall and stemflow.
c. Litter interception and potential infiltration.
d. Evapotranspiration of water.

V. Infiltration and Runoff.
a. Soil characteristics, vegetation disturbance and effect on infiltration rates.
b. Surface and subsurface flow of water.
c. Measurement of water yield, and stream hydrograph construction and analysis.

VI. Measurement of Watershed Characteristics.
a. Basin area, aspect and topographic relief.
b. Stream order, drainage density, and total length of perennial and intermittent streams.
c. Streamflow, discharge rates, erosion and sedimentation.

VII. Resource Management Activities and Effect on Water Quality and Quantity.
a. Timber harvesting and log road construction.
b. Range management and grazing influences.
c. Wildland fire and cumulative management effects.

VIII. Other Aspects of Watershed Management.
a. Flooding and flood control structures.
b. Snow hydrology.
c. Watershed restoration and rehabilitation.

**Assignment:**

1. Reading assignments from the text.
2. Five field lab reports during the semester.
3. Skill demonstration of use of field equipment.
4. Construction of a river hydrograph.
5. Design of drainage structures from information gathered in the field.

**Methods of Evaluation/Basis of Grade:**

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

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| None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments and skill demonstrations are more appropriate for this course. | Writing<br>0 - 0% |

**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

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| Homework problems, Field work, Lab reports, Exams | Problem solving<br>30 - 50% |

**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

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| Class performances, Field work, Performance exams | Skill Demonstrations<br>40 - 60% |

**Exams:** All forms of formal testing, other than skill performance exams.

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| Multiple choice, True/false, Matching items, Completion | Exams<br>10 - 25% |

**Other:** Includes any assessment tools that do not logically fit into the above categories.

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| None | Other Category<br>0 - 0% |

**Representative Textbooks and Materials:**
WATERSHED HYDROLOGY, by Peter Black, Ann Arbor Press, 2nd Edition, 1997.